CLAIMS

WE CLAIM:

1. A disk drive system comprising:

a rotatably mounted magnetic disk;

a rotor coupled to the magnetic disk;

a stator for rotatably retaining the rotor;

a bearing that serves as an interface between the stator and the rotor;

a motor coupled to the rotor for rotating the magnetic disk via the rotor; and

a lubricant disposed in the bearing, wherein the lubricant is comprised of a lubricating medium and a charge-control additive for reducing charge accumulation in the bearing.

2. The disk drive system of claim 1, comprising a plurality of rotatably mounted and spaced-apart magnetic disks mounted on the rotor, such that the motor rotates the magnetic disks via the rotor.

3. The disk drive system of claim 1, wherein the motor is constructed to rotate the rotor at a rate greater than 3,500 revolutions per minute.

4. The disk drive system of claim 1, wherein the bearing is a journal bearing.

5. The disk drive system of claim 1, wherein the bearing is a thrust bearing.

6. The disk drive system of claim 1, wherein the bearing is a spiral groove bearing

7. The disk drive system of claim 1, wherein the bearing is a herringbone groove bearing.

8. The disk drive system of claim 1, wherein the bearing is formed from surfaces that are embossed with grooves to create an internal pressure within the lubricant.

9. The disk drive system of claim 1, wherein the lubricating medium is comprised of an oil.

10. The disk drive system of claim 1, wherein the charge-control additive is solubilized or dissolved in the lubricating medium.

11. The disk drive system of claim 1, wherein the charge-control additive is comprised of dioctylediphenylamine, an oligomer thereof, or a combination of the foregoing.

12. The disk drive system of claim 1, wherein the charge-control additive is comprised of phenylnaphthylamine, an oligomer thereof, or a combination of the forgoing.

13. The disk drive system of claim 12, wherein the charge-control additive is further comprised of dioctylediphenylamine, an oligomer thereof, or a combination of the foregoing.

14. The disk drive system of claim 1, wherein the charge-control additive is comprised of an oligomer of phenylnaphthylamine and dioctylediphenylamine.

15. The disk drive system of claim 1, wherein the lubricant is further comprised of a conductivity-enhancing additive for enhancing the electrical conductivity of the lubricant.

16. The disk drive system of claim 15, wherein the conductivity-enhancing additive is solubilized or dissolved in the lubricating medium.

17. The disk drive system of claim 15, wherein the conductivity-enhancing additive is comprised of an aniline, an oligomer thereof, a polymer thereof, or a combination of the forgoing.

18. In a disk drive system comprising a rotatably mounted magnetic disk, a rotor coupled to the magnetic disk, a motor coupled to the rotor for rotating the magnetic disk via the rotor, a stator for rotatably retaining the rotor, a bearing that serves as an interface between the stator and the rotor, a replaceable lubricant in the bearing, and a slider in operative association with the magnetic disk, wherein the system is prone to experience electrostatic discharge between a magnetic disk and a slider, the improvement comprising replacing the replaceable lubricant with a replacement lubricant having a lower relative electrical permittivity.

19. The disk drive system of claim 18, wherein the replacement lubricant has an electrical conductivity equal to or greater than the replaceable lubricant.

20. The disk drive system of claim 18, wherein the replacement lubricant is comprised of a lubricating medium and a charge-control additive for reducing the charge accumulation in the bearing.

21. The disk drive system of claim 20, wherein the charge-control additive is comprised of an oligomer of phenylnaphthylamine and dioctylediphenylamine.

22. The disk drive system of claim 18, wherein the replacement lubricant is further comprised of a conductivity-enhancing additive for enhancing the electrical conductivity of the replacement lubricant.

23. The disk drive system of claim 22, wherein the conductivity-enhancing additive is comprised of an aniline, an oligomer thereof, a polymer thereof, or a combination of the forgoing.

24. The disk drive system of claim 18, wherein the replacement lubricant reduces electrostatic discharge between the magnetic disk and the slider from at least about 200 nA to no more than about 50 nA.

25. A disk drive system comprising:

a rotatably mounted magnetic disk;

a rotor coupled to the magnetic disk;

a stator for rotatably retaining the rotor;

a bearing that serves as an interface between the stator and the rotor;

a motor coupled to the rotor for rotating the magnetic disk via the rotor; and

a lubricant disposed in the bearing, wherein the lubricant has a DC relative electrical permittivity no greater than about 25,000 at 50 °C.

26. The disk drive system of claim 25, wherein the DC relative electrical permittivity is no greater than about 10,000 at 50 °C.

27. The disk drive system of claim 25, wherein the lubricant is comprised of a lubricating medium and a charge-control additive for reducing the charge on the bearing.

28. The disk drive system of claim 27, wherein the charge-control additive is comprised of an oligomer of aromatic amines, alkylated aromatic amines, or any combination thereof

29. The disk drive system of claim 28, wherein the charge-control additive is comprised of an oligomer of phenylnaphthylamine and dioctylediphenylamine.

30. The disk drive system of claim 25, wherein the lubricant is further comprised of a conductivity-enhancing additive for enhancing the electrical conductivity of the lubricant.

31. The disk drive system of claim 29, wherein the conductivity-enhancing additive is comprised of an aniline, an oligomer thereof, a polymer thereof, or a combination of the foregoing.